Determination of preoperative hypertension prevalence and awareness in patients before elective surgery

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Abstract

Aim: This study was conducted to reduce target organ damage and perioperative morbidity by early diagnosis of uncontrolled hypertension, considering the morbidities associated with hypertension.

Material and Methods: The data of 400 volunteer patients who met the sample eligibility criteria and applied to the anesthesiology outpatient clinic before elective surgery in Konya City Hospital were analyzed. The socio-demographic characteristics, anthropometric data, and the average of two blood pressure measurements of the patients were recorded. Hypertension (HT) was defined as systolic blood pressure (SBP) ≥ 130 mmHg and/or diastolic blood pressure (DBP) ≥ 80 mmHg. Body Mass Index (BMI) and Body Roundness Index (BMI) were calculated with the formula. They were categorized as average weight (BMI <25 kg m-2), overweight (25 ≤ BMI <30 kg m-2), and obese (BMI ≥ 30 kg m-2) according to their BMI.

Results: Seven out of ten adult patients admitted to the anesthesiology outpatient clinic before elective surgery were hypertensive. While 60% of these were unaware of having HT, only 22% of those diagnosed had blood pressure under control.

Discussion: As a result of our study, the high prevalence and low awareness of blood pressure indicate that hypertension is a common problem in our country. Furthermore, since HT remains a significant risk factor for morbidity and mortality, preoperative evaluation of patients provides a unique opportunity to diagnose and initiate treatment.

Keywords

Hypertension, Body Mass Index, Preoperative, Blood Pressure, Awareness

Introduction

Hypertension (HT) is the most common medical diagnosis. It is predicted that more than 1 billion people worldwide suffer from HT, and with increasing age and sedentary living conditions, HT prevalence will rise to 1.5 billion in 2025 [1]. High blood pressure is associated with life-threatening comorbidities such as ischemic heart disease, heart failure, renal failure, and cerebrovascular disease [2]. Although effective blood pressure management can reduce the incidence of complications in patients with hypertension, in general, poorly controlled blood pressure prevalence is quite high. Moreover, in a significant part of the population, non-diagnosed hypertension is common in both developed and developing countries [3, 4].

The relationship between uncontrolled HT and negative perioperative results has been known since the 1950s. HT has a high prevalence in patients presenting for surgery. Therefore, it is very important for anesthetists to determine blood pressure to evaluate the patient's condition before and during surgery. Considering the morbidity associated with HT, which is not noticed, even though it has been diagnosed at all, is not treated or untreated at the optimal level, the diagnosis of preoperative hypertension provides a unique opportunity to initiate or optimize the treatment. This study aimed to determine the prevalence of HT and awareness in patients who applied to the anesthesia polyclinic for surgery preparation and to determine the relationship between HT and demographic and anthropometric measurements.

Material and Methods

For this prospective, observational, and descriptive research, the University of Health Sciences (SBU) scientific studies Ethics Committee (No: E-46418926-050.01.04-5425) and Konya City Hospital TUEK (Issue No: 34028083-799) were obtained from the Ethics Committee (NO: E-46418926-050.01.04-5425- 15.01.2021 Ethics ethical approval date). The sample of this study consists of patients aged 18 years and older who applied to the anesthesiology outpatient clinic before electrical surgical procedures other than Cardiovascular Surgery and Obstetric Surgery between April 2021 and June 2021 at Konya City Hospital. Oral and written consent was obtained from all patients evaluated to comply with the sample criteria and to be included in the research. Patients' detailed medical history, demographic characteristics, comorbid diseases, existing drug use, smoking, and alcohol use data were recorded.

Blood pressure measurement; The patients did not smoke and did not drink tea, coffee, and caffeine 30 minutes before the blood pressure measurement, and they were allowed to rest for at least 10 minutes. Using the appropriate size blood pressure cuff (Microlife Exact BP, Microlife Ag, Widnau, Switzerland), two measurements were made from the right arm with a 5-minute interval. The average of two measurements was evaluated. According to the definition of the 2017 ACC/AHA guide; Patients with systolic (SBP) and/or diastolic (DBP) blood pressure ≥130/80 mmHg and/or those using antihypertensive medication were recorded as hypertensive patients (Table 1) [5].

HT Disease Duration: The time since the diagnosis was defined as Month(s). HT awareness ; It has been described as a health worker telling the presence of hypertension to individuals with hypertension. HT treatment; was defined as the use of antihypertensive treatment in for patients who applied to the anesthesia polyclinic before surgery. Controlled HT:; Taking medication for hypertension was defined as the fact that blood pressure measurements are SBP <130 mmHg and DBP <80 mmHg.

Body Mass Index (BMI) was calculated using the following formula:

$BMI = Weight (kg) / height (m)^2$.

Patients According to the Global Classification WHO (World Patients were classified According to WHO (World Health Organization) Classification; BMI <25 kg m-2: Normal weight, 25 ≤ BMI <30 kg m-2): overweight, and BMI ≥ 30 kg m-2: obese [6].

Waist circumference (cm) was measured along thein horizontal circumference between the costal margins and the iliac crest at the end of expiration using a non-stretchable tape measure. Body roundness index (BRI); has been developed as an alternative to the measurement of BMI and waist circumference calculated based on size (m) and waist circumference (m) [7]. The BRI values calculated by the formula below were evaluated between 1 and 16.

$BRI=364,2-(365,5*\sqrt{(1-((waist\ circumference\ )/2n)^{^2}/((0,5\ height)^{^2}\ )))}$

Statistical analysis

In When analyzing the data obtained in the study, the IBM-Statistic Package for Social Sciences (IBM-SPSS INC., Chicago, IL, USA) was used. The suitability of the data to normal distribution was examined with the 'Kolmogorov-Smirnov test. Continuous variables were expressed as average and standard deviation depending on the distribution status, and categorical variables were expressed as numbers and percentages. In cases where parametric test assumptions were provided in the analysis of continuous variables, T-Test was applied in independent groups ; otherwise, the 'The Mann-Whitney U test' was applied. 'Pearson's ChKi- Square tTest' was used to compare categorical variables. Logistics regression analysis was used in patients to determine possible independent risk factors associated with hypertension. The statistical significance level was considered at p <0.05.

Ethical Approval

Ethics Committee approval for the study was obtained.

Results

In this study, the data of 400 patients who met the requirements of inclusion were analyzed. In the study, 49.5 % (198) female and 50.5 % (202) male participants included. While the average age of the patients was 51 ± 15.47 years, the mean age of men and women was 51,53 ± 14.37 and 51.61 ± 16.51 years, respectively. The demographic data of the patients are shown in Table 2.

HT prevalence was found to be 67.75 % (271 people). While 61.3 % (166 people) were not aware of the height of blood pressure, 38.7 % were diagnosed with HT. 77.14 % (81 patients) of patients diagnosed with HT used antihypertensive drugs (Figure 1). 23.4 % of these patients had blood pressure values within the normal range.

There was a statistically significant difference between age and HT (p <0.01) (Table 2). In logistics regression analysis, BMI and age were independent hypertension risk factors. High BMI (21.4% increase) and advanced age (6%) significantly increased the risk of hypertension (Table 2). A statistically significant relationship was found between HT and cigarette consumption, diabetes, and ASA score (each p <0.01). Patients were divided into two groups: non-obese (BMI <30) and obese (BMI≥30) according to BMI values. The relationship analysis between obesity and BRI is shown in Figure 1. The average BRI average of obese patients was 6.74 ± 1.48 and the average of non-obese patients was 4,18 ± 1.21. This difference between the groups was found statistically significant.

Table 1. 2017 ACC/AHA Hypertension Guideline.

Hypertension Classification	
Systolic-Diastolic Hypertension	SBP≥130 mmHg
	DBP≥80 mmHg
Systolic	SBP≥130 mmHg
Hypertension	DBP<80 mmHg
Diastolic Hypertension	SBP<130 mmHg
	DBP ≥80 mmHg

ACC/AHA: American Cardiology College/ American Heart Association
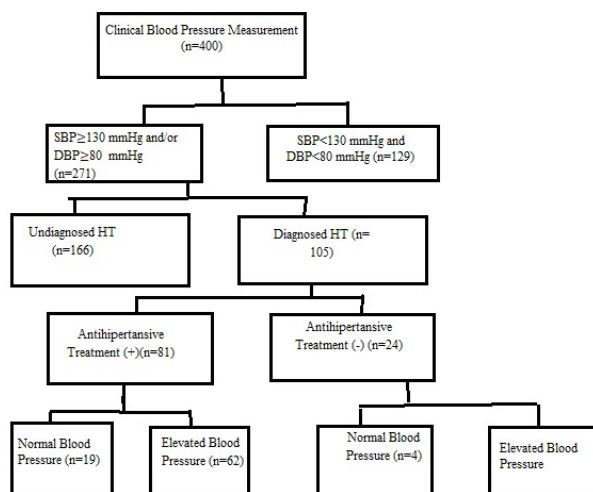SBP: systolic blood pressure, DBP: diastolic blood pressure

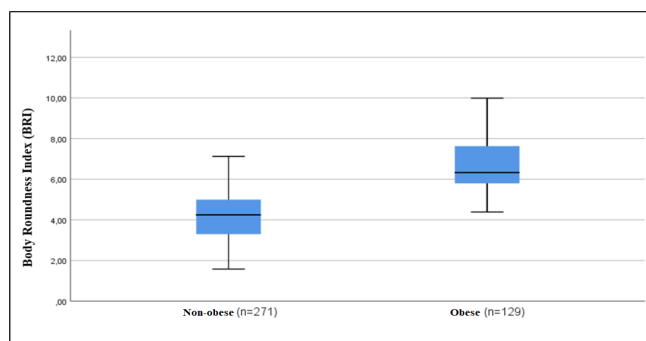**Figure 1.** Evaluation of analysis results.

Figure 2. Relationship between obesity and Body Roundness Index.

Table 2. Demographic Data of Participants.

	Hipertansive n (%)	Normotansive n (%)	p
Gender			
Female	141 (%52)	57 (%44,2)	0,14
Male	130 (%48)	72 (%55,8)	
Age			
18-29	8 (3,0%)	27 (20,9%)	
30-49	88 (32,5%)	63 (48,8%)	<0,01
50-59	63 (23,2%)	24 (18,6%)	
≥60	112 (41,3%)	15 (11,6%)	
BMI			
<30	157 (57,9%)	114 (88,4%)	<0,01
≥30	114 (42,1%)	15 (11,6%)	
ASA			
1	35 (12,9%)	40 (31,0%)	
2	175 (64,6%)	79 (61,2%)	<0,01
3	59 (21,8%)	9 (7,0%)	
4	2 (0,7%)	1 (0,8%)	
Smoker			
Yes	72 (26,6%)	57 (44,2%)	<0,01
No	199 (73,4%)	72 (55,8%)	
Alcohol consumption			
Yes	10 (3,7%)	10 (7,8%)	0.08
No	261 (96,3%)	119 (92,2%)	
Diabetes Mellitus			
Yes	54 (19,9%)	9 (9,7%)	<0,01
No	217 (80,1%)	120 (90,3%)	

BMI: Body Mass Index, ASA: American Society of Anesthesiologists

Table 3. Multivariable logistics regression analysis of variables in hypertension patients.

Risk factor	OR (%95 CI)	p-value
Age	1,062(1,041-1,084)	<0,01
Smoker	1,260(0,757-2,098)	0,37
DM	1,240(0,537-2,862)	0,62
BRI	0,830(,617-1,117)	0,22
BMI	1,214(1,100-1,340)	<0,01

OR=Odd's ratio, CI: confidence interval

Discussion

The most important results we reached as a result of this research were; Seven out of ten adult patients admitted to the anesthesiology outpatient clinic before elective surgery were hypertensive. While approximately 60 % were HT, the blood pressure of only one-fifth of the diagnostic areas were under control.

HT is a global public health problem. According to the first comprehensive global analysis report of tendencies in the detection, treatment, and control of HT prevalence, the number of adults with hypertension between the ages of 30-79 years has doubled in the last thirty years around the world [8]. HT is also a very common problem in our country and 1 out of every 3 people has HT [9]. We found preoperative HT prevalence as 67.75 %. The fact that this rate is higher than in previous research may be associated with the average age of our patient population. Age is an important risk factor for HT. Therefore,

a more detailed research is required in terms of HT presence in the preoperative period, especially in the geriatric patient population. Another possible reason for this high prevalence may be that in clinical guidelines that were valid in previous years, may have adopted lower blood pressure for the diagnosis of HT [1, 10, 11].

A recent study reported that approximately half of the individuals with high blood pressure measurements are unaware of this and that more than half of them cannot receive the necessary [8]. Similar to the literature, we have found that two-thirds of patients with high preoperative blood pressure are unaware of the presence of HT. Since hypertension cannot be realized, the risk of fatal complications in individuals such as cardiovascular diseases and stroke increases. Since it is a major risk factor for HT morbidity and mortality, every opportunity should be evaluated to start diagnosis and treatment. For many patients, the most intense contact with the healthcare system usually occurs in the perioperative process, which they encounter for the first time. Thus, anesthetists can significantly contribute to the long-term prognosis of hypertensive patients who have not been identified or have been insufficiently treated.

General recommendations of all guidelines for the effective control of hypertension include lifestyle changes such as descending to an appropriate weight, limiting sodium intake, avoiding processed food consumption, and avoiding smoking and alcohol. However, the most serious problem the treatment of HT is that patients cannot adapt to clinical recommendations [12]. Our study determined that only one-fifth of patients who use regular medication were under the control of blood pressure. Despite the use of drugs, it suggests that poor blood pressure control may be related to the lack of life changes.

There are several limitations to this study. First, HT prevalence in this cohort may be more predicted. Although the HT was assessed in patients undergoing electrical surgery, the day before the surgery, some of the patients were worried. Thus, incorrectly high measurements may have been obtained. In addition, since emergency cases and cardiac and obstetric cases were excluded, it was impossible to determine the real hypertension prevalence in patients who applied for all surgeries. However, since they are likely to have more comorbid diseases than the electrical population, hypertension prevalence in patients presenting for emergency surgery is different and could not be determined in our research. Finally, more comprehensive studies are needed because the study sample is relatively small.

Conclusions

In this study, blood pressure was high in 7 of every ten patients evaluated in the anesthesiology outpatient clinic before the surgical procedure, while awareness was approximately 40 %. HT is one of the common diseases that often occur in the preoperative period and should be regulated before surgery. Preoperative assessment has a significant potential impact on the patient results with the opportunity to identify undiagnosed hypertension and improve management of known hypertensive patients. As a result of our study, the high prevalence of blood pressure and low awareness shows that hypertension is a common problem in our country. Since HT continues to be a major risk factor for morbidity and mortality, it provides a unique opportunity to evaluate patients in the preoperative period to start diagnosis and treatment.

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